helices, provided the ends of the helix wires are connected together either singly in two separate circuits, or together in one continuous circuit. Every up or down movement of either of the helices produces currents in the wires either for or against magnetization, which currents apparently so disturb the molecules of the iron that the fixity of their original magnetic direction is lost.

In like manner as the movements of the armature, or the increased or diminished tension of the iron, produce currents of electricity in the helix wires surrounding the magnets: so the movements of the helices produce currents of electricity which may either magnetize or demagnetize the iron. With the 58 lb. magnet in closed circuit, the two ends of one of the helices being connected to the galvanometer, and the two ends of the other helix being connected with each other, the latter helix is moved towards the armature, a current is produced in the galvanometer helix which shows a fall of magnetization. On moving the same helix away from the armature, a current is produced in the direction of magnetization.

In another experiment 30 yards of No. 16 covered copper wire, with its ends connected together, and so coiled that it could be moved freely from pole to pole over the armature, was placed on one limb of the 58 lb. magnet and the closed circuit established. Both helices were then brought into continuous circuit through the galvanometer.

On movement of the coil of wire from south limb to the north limb of the magnet, a current was produced showing an increase of magnetization. On moving the coil in the opposite direction, *i.e.*, over the north limb pole, and on to the south one, the current is reversed, and is in a direction which would cause demagnetization.

It appears, therefore, that any interference with the lines of force about a magnetic circuit, means an interference with the magnetic circuit itself, and points to the possibility of building up magnetic force of magnets by the mere movement of wires in these lines of force, though the coils moved need not of necessity be connected with the helices surrounding the magnets.

VII. "Some further Observations on the Influence of Electric Light upon Vegetation." By C. William Siemens, D.C.L., LL.D., F.R.S. Received March 18, 1880.

When upon the 4th of March, I presented to the Royal Society a paper on the above-named subject, I was able to show by the result of experiment the effect of radiation from the electric arc in promoting the formation of chlorophyll within the leaf-cell of plants, and in favouring vigorous and continuous growth.

I ventured to express an opinion that the ripening of fruit would

be accelerated by the same agency, but proof thereof was then wanting. A continuation of my experiments has furnished interesting evidence that the electric arc is also efficacious in hastening the ripening process in strawberries, and probably in nearly every description of fruit.

Several plants of early strawberries in pots were divided as before into two groups, the one to be subjected to the action of daylight only, and the other to solar light during the day time, and to electric light during the night. Both groups of plants were placed below glass at temperatures varying from 65° to 70° F., but those that were to receive daylight only were shielded from the effect of the electric light during the night by matting.

At the commencement of the experiment the strawberry plants selected were just setting fruit, being still partly in bloom. After eight days the fruit on the plants exposed to electric light had swelled very much more than on the others, some of the berries beginning to show signs of ripening. The experiment was interrupted for two nights at this stage, but after the electric light was resumed, very rapid progress towards ripening was observable; so that with four days' continuous exposure to both day and electric light, the greater number of the berries had attained to ripeness, and presented a rich colouring, while the fruit on those plants that had been exposed to daylight only had by this time scarcely begun to show even a sign of redness.

This experiment goes to show that the electric light is very efficacious in promoting the formation of the saccharine and aromatic matter upon which the ripening and flavour of fruit depends; and if experience should confirm this result, the horticulturist will have the means of making himself practically independent of solar light for producing a high quality of fruit at all seasons of the year.

Two strawberry plants are placed before the meeting illustrative of the result here described.

Although I have shown that in employing a lamp of 1,400 candle-power a distance of 3 metres produces a maximum beneficial result on vegetation, the effect is nevertheless very marked upon plants at greater distances. This influence at a distance was illustrated in my experiments by the condition of three melon plants towards the back of the house, which throve remarkably well for a period of about a fortnight, during which the electric light was placed in front of the house, at a distance of from 5 to 6 metres from the plants. The electric light was then removed in front of the other end of the same house, thus depriving the plants in question of its influence, since which time they have continued their growth, but show a very decided falling off in size and colouring of the leaves that have since formed.

In reply to the questions that have been frequently asked regarding the cost of maintaining an experimental electric light of 1,400 candle-power, such as I have used in these experiments, I may state that the 3 horse-power Otto gas engine employed in driving the dynamo-machine, consumes nearly 900 cubic feet of gas during the night of 12 hours, or 75 cubic feet an hour (including 7 cubic feet of gas employed by the igniting burner) which, at 3*s.* 6*d.* per 1,000 cubic feet, represents a cost of a little over 3*d.* an hour, or with the carbons 5*d.* an hour. This, however, does not include superintendence or incidental expenses, the amount of which must depend upon the circumstances of each case.*

The Society then adjourned over the Easter Recess to Thursday, April 8th, at half-past four in the afternoon.

Presents, March 4, 1880.

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* Since sending in my paper to the Royal Society my attention has been drawn to some experiments made in 1861 by M. Hervé-Mangon, who proved that by means of the electric light, chlorophyll was developed in young plants of rye.